

# Climate to Curriculum Teacher Pre-Survey

## Background Information

Thank you for taking this pre-survey for the Connecting Climate to Curriculum workshop series. Your responses will help us understand the extent to which goals for the workshops are met.

1. The survey should take you around 45 min-1 hour.
2. You will answer first for yourself and secondly, making quick predictions about your students' responses.
3. You may stop at any time and come back to finish later, BUT you must use the same computer each time you work on the survey.
4. Survey results will be reported only as a summary of all participants' responses. Your individual survey responses will not be linked to your name, and will remain confidential.

### 1. Personal Information:

Name:

Identification code (enter month and day of your birthday followed by first and last initials, ie. 1123HM for Nov 23, Hannah Montana):

School:

Highest education achieved:

Number of years teaching experience:

Subject/s:

### 2. Class information

Total number of students (approximately) you will work with in the coming year:

Average class size:

Length of class period:

Computer accessibility: (i.e. computer room, MLTI's, or other)

Please briefly describe any scientific research experience you have had:

# Climate to Curriculum Teacher Pre-Survey

## Science and How People Learn

### 3. How often do you do each of the following in your science instruction?

	Never	a few times/year	a few times/month	almost always
a. Use text book instructional materials as the basis of science lessons.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. Introduce content through formal presentations.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Use a demonstration to show a science-related principle or phenomenon.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Use real-world contexts or examples to teach a concept.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. Use open-ended questions to "seed" student discussions.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f. Require students to supply evidence to support their claims.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g. Give students opportunities to explain concepts to one another.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h. Give students opportunities to explore/consider alternative explanations.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
i. Help students see connections between science and other disciplines.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
j. Use science to teach math and literacy.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
k. Use assessment strategies to find out what students know before or during a unit.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
l. Assign review questions from the text book.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
m. Have students take notes during a formal presentation.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
n. Read and comment on the reflections students have written in their notebooks or journals.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
o. Assess or review your own prior knowledge before beginning a new topic or content area.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Additional comments (please specify):

5

6

# Climate to Curriculum Teacher Pre-Survey

## Fundamental physical concepts

Please answer all of the questions to the best of your ability. In some cases there may be more than one correct answer. However, each question has only one BEST answer. Choose the SINGLE BEST ANSWER from the choices for each question. In the comments section following the question, predict what PERCENTAGE of your students taking this test will select the CORRECT answer. Then, on the duplicate question following, select the choice that you think is the INCORRECT answer SELECTED MOST OFTEN by your students.

**Sue cuts a straight and uniform board into three differently sized pieces. Each piece has the same width and height, but different lengths. A is shortest, C is longest.**



**4. Which piece has the greatest volume?**

- ☐ a. Piece A
- ☐ b. Piece B
- ☐ c. Piece C
- ☐ d. They all have the same volume.
- ☐ e. It is impossible to tell without making more measurements.

Estimated percentage of students who will answer correctly:

**5. Choose the choice that you think is the INCORRECT answer SELECTED MOST OFTEN by your students:**

**Which piece has the greatest volume?**

- ☐ a. Piece A
- ☐ b. Piece B
- ☐ c. Piece C
- ☐ d. They all have the same volume.
- ☐ e. It is impossible to tell without making more measurements.

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## 6. Which piece has the greatest density?

- ☐ a. Piece A
- ☐ b. Piece B
- ☐ c. Piece C
- ☐ d. They all have the same density.
- ☐ e. It is impossible to tell without making more measurements.

Estimated percentage of students who will answer correctly:

## 7. Choose the choice that you think is the INCORRECT answer SELECTED MOST OFTEN by your students:

### Which piece has the greatest density?

- ☐ a. Piece A
- ☐ b. Piece B
- ☐ c. Piece C
- ☐ d. They all have the same density.
- ☐ e. It is impossible to tell without making more measurements.

## 8. Which piece has the greatest mass?

- ☐ a. Piece A
- ☐ b. Piece B
- ☐ c. Piece C
- ☐ d. They all have the same mass.
- ☐ e. It is impossible to tell without making more measurements.

Estimated percentage of students who will answer correctly:

## Climate to Curriculum Teacher Pre-Survey

**9. Choose the choice that you think is the INCORRECT answer SELECTED MOST OFTEN by your students:**

**Which piece has the greatest mass?**

- ☐ a. Piece A
- ☐ b. Piece B
- ☐ c. Piece C
- ☐ d. They all have the same mass.
- ☐ e. It is impossible to tell without making more measurements.

**10. A solid rubber ball sinks when placed in water. What will happen if the ball is cut in half and one of the smaller pieces is placed underwater?**

- ☐ a. The smaller piece will rise.
- ☐ b. The smaller piece will sink.
- ☐ c. The smaller piece will stay motionless.
- ☐ d. The smaller piece will dissolve.
- ☐ e. There is no way to predict what will happen.

Estimated percentage of students who will answer correctly:

**11. Choose the choice that you think is the INCORRECT answer SELECTED MOST OFTEN by your students:**

**A solid rubber ball sinks when placed in water. What will happen if the ball is cut in half and one of the smaller pieces is placed underwater?**

- ☐ a. The smaller piece will rise.
- ☐ b. The smaller piece will sink.
- ☐ c. The smaller piece will stay motionless.
- ☐ d. The smaller piece will dissolve.
- ☐ e. There is no way to predict what will happen.

## Climate to Curriculum Teacher Pre-Survey

**12. A pebble is dropped into a cup of water and sinks to the bottom of the cup. A solid metal bead of exactly the same size is dropped into the same cup and sinks to the bottom of the cup. How do the pebble and the metal bead compare?**

- ☐ a. The metal bead and the pebble have the same density.
- ☐ b. The metal bead and the pebble are the same mass.
- ☐ c. The metal bead and the pebble are denser than water.
- ☐ d. The metal bead and the pebble contain the same materials.
- ☐ e. The metal bead and the pebble are as dense as the water.

Estimated percentage of students who will answer correctly:

**13. Choose the choice that you think is the INCORRECT answer SELECTED MOST OFTEN by your students:**

**A pebble is dropped into a cup of water and sinks to the bottom of the cup. A solid metal bead of exactly the same size is dropped into the same cup and sinks to the bottom of the cup. How do the pebble and the metal bead compare?**

- ☐ a. The metal bead and the pebble have the same density.
- ☐ b. The metal bead and the pebble are the same mass.
- ☐ c. The metal bead and the pebble are denser than water.
- ☐ d. The metal bead and the pebble contain the same materials.
- ☐ e. The metal bead and the pebble are as dense as the water.

**14. Scientists say a metal doorknob indoors often feels cold to you because:**

- ☐ a. Cold from the doorknob goes into your hand.
- ☐ b. Warmth from your hand goes into the doorknob.
- ☐ c. Cold moves from the doorknob into your hand.
- ☐ d. Warmth is pulled from the doorknob by your hand.
- ☐ e. Metals are always colder than air.

Estimated percentage of students who will answer correctly:

## Climate to Curriculum Teacher Pre-Survey

**15. Choose the choice that you think is the INCORRECT answer SELECTED MOST OFTEN by your students:**

**Scientists say a metal doorknob indoors often feels cold to you because:**

- ☐ a. Cold from the doorknob goes into your hand.
- ☐ b. Warmth from your hand goes into the doorknob.
- ☐ c. Cold moves from the doorknob into your hand.
- ☐ d. Warmth is pulled from the doorknob by your hand.
- ☐ e. Metals are always colder than air.

**Two identical jars are placed on a table with a light bulb between them. The bulb is turned on. One jar is filled with water and the other jar is filled with black ink. There is a thermometer hanging in each jar.**



**16. What do you think will happen?**

- ☐ a. The jar with water will be hotter than the jar with black ink.
- ☐ b. The jar with black ink will be hotter than the jar with water.
- ☐ c. There will be no difference in the temperature of the two jars.
- ☐ d. The temperature in both the jars will drop.
- ☐ e. The temperature in the jar with black ink will first drop and then increase.

Estimated percentage of students who will answer correctly:

## Climate to Curriculum Teacher Pre-Survey

**17. Choose the choice that you think is the INCORRECT answer SELECTED MOST OFTEN by your students:**

**What do you think will happen?**

- ☐ a. The jar with water will be hotter than the jar with black ink.
- ☐ b. The jar with black ink will be hotter than the jar with water.
- ☐ c. There will be no difference in the temperature of the two jars.
- ☐ d. The temperature in both the jars will drop.
- ☐ e. The temperature in the jar with black ink will first drop and then increase.



# Climate to Curriculum Teacher Pre-Survey

## Earth position and movements

**18. Of the days below, which has more hours of daylight in Maine?**

- ☐ a. June 21
- ☐ b. July 21
- ☐ c. August 21
- ☐ d. September 21
- ☐ e. All dates are the same.

Estimated percentage of students who will answer correctly:

**19. Choose the choice that you think is the INCORRECT answer SELECTED MOST OFTEN by your students:**

**Of the days below, which has more hours of daylight in Maine?**

- ☐ a. June 21
- ☐ b. July 21
- ☐ c. August 21
- ☐ d. September 21
- ☐ e. All dates are the same.



## Climate to Curriculum Teacher Pre-Survey

**20. When it's summer in Maine, which season is it on the opposite side of the Earth in New Zealand?**

- ☐ a. Summer
- ☐ b. Spring
- ☐ c. Winter
- ☐ d. Fall

Estimated percentage of students who will answer correctly:

**21. Choose the choice that you think is the INCORRECT answer SELECTED MOST OFTEN by your students:**

**When it's summer in Maine, which season is it on the opposite side of the Earth in New Zealand?**

- ☐ a. Summer
- ☐ b. Spring
- ☐ c. Winter
- ☐ d. Fall

**22. How long does it take for the Earth to turn once on its axis?**

- ☐ a. One day.
- ☐ b. One week.
- ☐ c. One month.
- ☐ d. One year.
- ☐ e. It never happens.

Estimated percentage of students who will answer correctly:

## Climate to Curriculum Teacher Pre-Survey

**23. Choose the choice that you think is the INCORRECT answer SELECTED MOST OFTEN by your students:**

**How long does it take for the Earth to turn once on its axis?**

- ☐ a. One day.
- ☐ b. One week.
- ☐ c. One month.
- ☐ d. One year.
- ☐ e. It never happens.

**24. Five friends were talking. They each had different ideas about why it is warmer in the summer than in the winter. Which friend do you most agree with?**

- ☐ a. Werner: "It's because the winter clouds block heat from the Sun."
- ☐ b. Ava: "It's because the Sun gives off more heat in the summer than in winter."
- ☐ c. Raul: " It's because Earth's tilt changes the angle of sunlight hitting Earth."
- ☐ d. Fernando: "It's because the Earth orbits closer to the Sun in the summer than in the winter."
- ☐ e. Susan: "It's because the Northern Hemisphere is closer to the Sun in summer than in the winter."

Estimated percentage of students who will answer correctly:

**25. Choose the choice that you think is the INCORRECT answer SELECTED MOST OFTEN by your students:**

**Five friends were talking. They each had different ideas about why it is warmer in the summer than in the winter. Which friend do you most agree with?**

- ☐ a. Werner: "It's because the winter clouds block heat from the Sun."
- ☐ b. Ava: "It's because the Sun gives off more heat in the summer than in winter."
- ☐ c. Raul: " It's because Earth's tilt changes the angle of sunlight hitting Earth."
- ☐ d. Fernando: "It's because the Earth orbits closer to the Sun in the summer than in the winter."
- ☐ e. Susan: "It's because the Northern Hemisphere is closer to the Sun in summer than in the winter."

# Climate to Curriculum Teacher Pre-Survey

## Earth processes, weather and climate

**26. Which is always true about a day when there are strong winds?**

- ☐ a. There are lots of clouds.
- ☐ b. The air temperature is low.
- ☐ c. It is raining.
- ☐ d. The air is moving.
- ☐ e. All of the above.

Estimated percentage of students who will answer correctly:

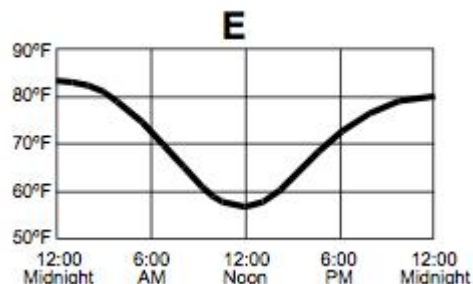
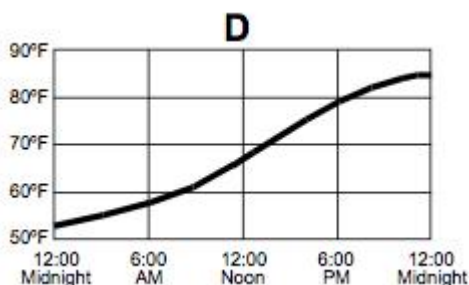
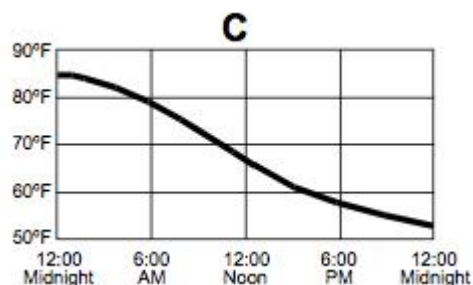
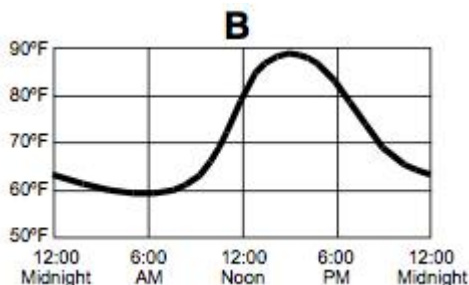
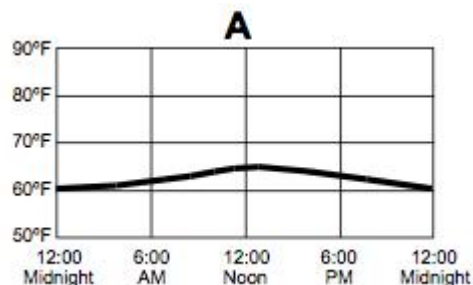
**27. Choose the choice that you think is the INCORRECT answer SELECTED MOST OFTEN by your students:**

**Which is always true about a day when there are strong winds?**

- ☐ a. There are lots of clouds.
- ☐ b. The air temperature is low.
- ☐ c. It is raining.
- ☐ d. The air is moving.
- ☐ e. All of the above.

# Climate to Curriculum Teacher Pre-Survey

The graphs below show the air temperature readings for five different days.



28. On which day was the sky most likely covered by clouds daytime and nighttime?

☐ A

☐ B

☐ C

☐ D

☐ E

Estimated percentage of students who will answer correctly:

29. Choose the choice that you think is the **INCORRECT** answer **SELECTED MOST OFTEN** by your students:

On which day was the sky most likely covered by clouds daytime and nighttime?

☐ A

☐ B

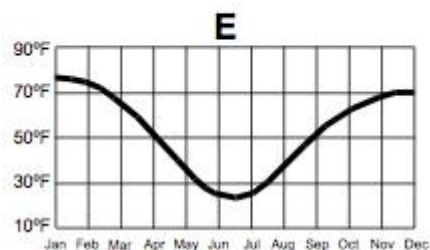
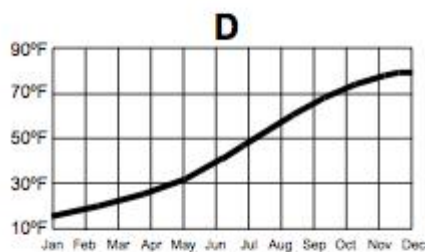
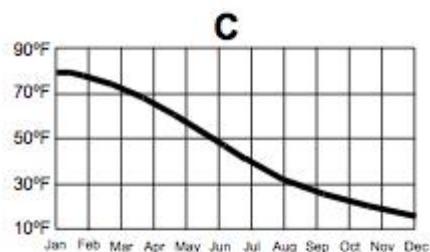
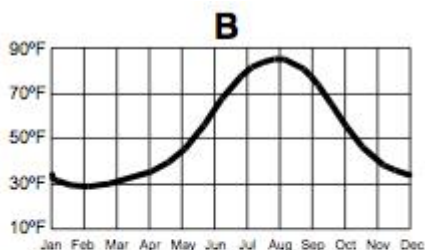
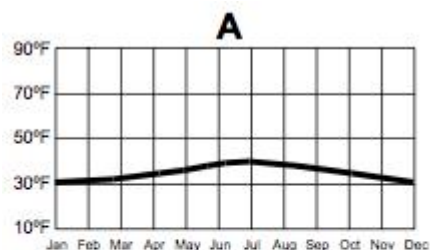
☐ C

☐ D

☐ E

# Climate to Curriculum Teacher Pre-Survey

The graphs below show the highest air temperature reading every day for one year at five different locations.



30. Which graph, most likely, is for a town in the middle of a large continent?

☐ A

☐ B

☐ C

☐ D

☐ E

Estimated percentage of students who will answer correctly:

31. Choose the choice that you think is the INCORRECT answer SELECTED MOST OFTEN by your students:

Which graph, most likely, is for a town in the middle of a large continent?

☐ A

☐ B

☐ C

☐ D

☐ E

# Climate to Curriculum Teacher Pre-Survey

## 32. Which of the following statements would a scientist say was true?

- ☐ a. Some mountains have formed due to many volcanic eruptions over a long time.
- ☐ b. Earth's climate went through changes before there were humans.
- ☐ c. Processes like landslides and avalanches are related.
- ☐ d. Both a and c.
- ☐ e. All three: a, b, and c.

Estimated percentage of students who will answer correctly:

## 33. Choose the choice that you think is the INCORRECT answer SELECTED MOST OFTEN by your students:

### Which of the following statements would a scientist say was true?

- ☐ a. Some mountains have formed due to many volcanic eruptions over a long time.
- ☐ b. Earth's climate went through changes before there were humans.
- ☐ c. Processes like landslides and avalanches are related.
- ☐ d. Both a and c.
- ☐ e. All three: a, b, and c.

## 34. Earth would be covered with ice if we did not have:

- ☐ a. Sunlight.
- ☐ b. The tilt of Earth's axis.
- ☐ c. Volcanoes.
- ☐ d. Human technology.
- ☐ e. An ozone hole.

Estimated percentage of students who will answer correctly:

## Climate to Curriculum Teacher Pre-Survey

**35. Choose the choice that you think is the INCORRECT answer SELECTED MOST OFTEN by your students:**

**Earth would be covered with ice if we did not have:**

- ☐ a. Sunlight.
- ☐ b. The tilt of Earth's axis.
- ☐ c. Volcanoes.
- ☐ d. Human technology.
- ☐ e. An ozone hole.

**36. Imagine Earth had no air, rain, or clouds. What would the temperatures be like during the night?**

- ☐ a. Temperatures at night would be the same.
- ☐ b. The night would get much hotter.
- ☐ c. The night would get much colder.
- ☐ d. The night would only warm up at the North and South Poles.
- ☐ e. There would not be any night.

Estimated percentage of students who will answer correctly:

**37. Choose the choice that you think is the INCORRECT answer SELECTED MOST OFTEN by your students:**

**Imagine Earth had no air, rain, or clouds. What would the temperatures be like during the night?**

- ☐ a. Temperatures at night would be the same.
- ☐ b. The night would get much hotter.
- ☐ c. The night would get much colder.
- ☐ d. The night would only warm up at the North and South Poles.
- ☐ e. There would not be any night.



## Climate to Curriculum Teacher Pre-Survey

**38. Which human activity directly adds the most carbon dioxide to the atmosphere?**

- ☐ a. Using nitrogenous fertilizer to grow crops.
- ☐ b. Burning fossil fuels.
- ☐ c. Using air conditioning.
- ☐ d. Generating electricity from nuclear reactions.
- ☐ e. Increasing the amount of paved surfaces.

Estimated percentage of students who will answer correctly:

**39. Choose the choice that you think is the INCORRECT answer SELECTED MOST OFTEN by your students:**

**Which human activity directly adds the most carbon dioxide to the atmosphere?**

- ☐ a. Using nitrogenous fertilizer to grow crops.
- ☐ b. Burning fossil fuels.
- ☐ c. Using air conditioning.
- ☐ d. Generating electricity from nuclear reactions.
- ☐ e. Increasing the amount of paved surfaces.

**40. Scientists think that compared to today, in the past Earth's climate has:**

- ☐ a. Always been the same.
- ☐ b. Cooled only during the Ice Age.
- ☐ c. Warmed and cooled many times.
- ☐ d. Warmed only since humans started burning fossil fuels.
- ☐ e. Been much less stormy.

Estimated percentage of students who will answer correctly:

## Climate to Curriculum Teacher Pre-Survey

**41. Choose the choice that you think is the INCORRECT answer SELECTED MOST OFTEN by your students:**

**Scientists think that compared to today, in the past Earth's climate has:**

- ☐ a. Always been the same.
- ☐ b. Cooled only during the Ice Age.
- ☐ c. Warmed and cooled many times.
- ☐ d. Warmed only since humans started burning fossil fuels.
- ☐ e. Been much less stormy.

**42. If there were no humans on Earth, which of the following would most likely happen?**

- ☐ a. It would be less windy.
- ☐ b. There would be stronger ocean currents.
- ☐ c. There would be more storms.
- ☐ d. There would be less volcanic activity.
- ☐ e. Conditions would be much the same as now.

Estimated percentage of students who will answer correctly:

**43. Choose the choice that you think is the INCORRECT answer SELECTED MOST OFTEN by your students:**

**If there were no humans on Earth, which of the following would most likely happen?**

- ☐ a. It would be less windy.
- ☐ b. There would be stronger ocean currents.
- ☐ c. There would be more storms.
- ☐ d. There would be less volcanic activity.
- ☐ e. Conditions would be much the same as now.

## Climate to Curriculum Teacher Pre-Survey

### 44. Scientists say Maine was most recently covered by a glacier:

- ☐ a. 500 years ago.
- ☐ b. 1,000 years ago.
- ☐ c. 5,000 years ago.
- ☐ d. 20,000 years ago.
- ☐ e. 1 million years ago.

Estimated percentage of students who will answer correctly:

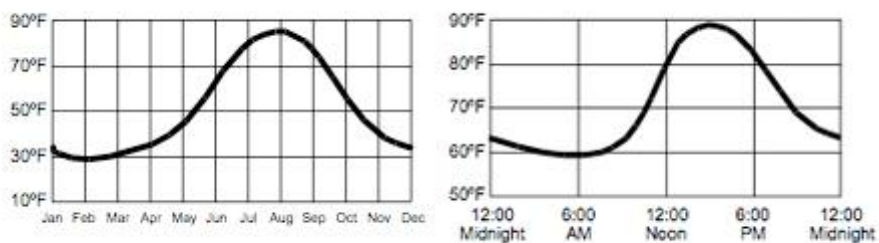
### 45. Choose the choice that you think is the INCORRECT answer SELECTED MOST OFTEN by your students:

#### Scientists say Maine was most recently covered by a glacier:

- ☐ a. 500 years ago.
- ☐ b. 1,000 years ago.
- ☐ c. 5,000 years ago.
- ☐ d. 20,000 years ago.
- ☐ e. 1 million years ago.

# Climate to Curriculum Teacher Pre-Survey

## SCALE and climate



**46. What differs between the graphs shown above?**

- ☐ a. Nothing, they are the same.
- ☐ b. The time scale
- ☐ c. The temperature scale
- ☐ d. Both b and c
- ☐ e. The shape of the curve

Estimated percentage of students who will answer correctly:

**47. Choose the choice that you think is the INCORRECT answer SELECTED MOST OFTEN by your students:**

**What differs between the graphs shown above?**

- ☐ a. Nothing, they are the same.
- ☐ b. The time scale
- ☐ c. The temperature scale
- ☐ d. Both b and c
- ☐ e. The shape of the curve

# Climate to Curriculum Teacher Pre-Survey

## 48. Scientists think which of the following has affected Earth for billions of years?

- ☐ a. Flowing water, such as rivers.
- ☐ b. Weathering processes.
- ☐ c. Earthquakes and volcanic eruptions.
- ☐ d. a, b, and c have all affected Earth for billions of years.
- ☐ e. None of the above has affected Earth for that long.

Estimated percentage of students who will answer correctly:

## 49. Choose the choice that you think is the INCORRECT answer SELECTED MOST OFTEN by your students:

### Scientists think which of the following has affected Earth for billions of years?

- ☐ a. Flowing water, such as rivers.
- ☐ b. Weathering processes.
- ☐ c. Earthquakes and volcanic eruptions.
- ☐ d. a, b, and c have all affected Earth for billions of years.
- ☐ e. None of the above has affected Earth for that long.

For the next 3 questions, you do not need to predict the most likely incorrect answer for your students.

## 50. Rank the following in order of size: 1=smallest 5=largest

	Smallest--1	2	3	4	Largest--5
a. The Planet Mars	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. The continent of Africa	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. The Solar System	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. The State of Texas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. The total area of oceans on Earth	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Estimated percentage of students who will answer correctly:

# Climate to Curriculum Teacher Pre-Survey

## 51. How often does each of the following occur?

	Daily	Weekly	Monthly	Yearly	Every several years
a. A full moon	jñ	jñ	jñ	jñ	jñ
b. Eating lunch	jñ	jñ	jñ	jñ	jñ
c. Showing "Survivor" on TV	jñ	jñ	jñ	jñ	jñ
d. Graduating from a school	jñ	jñ	jñ	jñ	jñ
e. Having a birthday	jñ	jñ	jñ	jñ	jñ

Estimated percentage of students who will answer correctly:

## 52. On which time scale do each of the following changes occur?

	One day	One year	Decades or centuries	Thousands of years	Millions of years
a. An ice age comes and goes.	jñ	jñ	jñ	jñ	jñ
b. The four seasons pass.	jñ	jñ	jñ	jñ	jñ
c. The sea floor spreads to create the Atlantic Ocean.	jñ	jñ	jñ	jñ	jñ
d. The sun rises and sets.	jñ	jñ	jñ	jñ	jñ
e. Erosion changes the path of a meandering river.	jñ	jñ	jñ	jñ	jñ

Estimated percentage of students who will answer correctly:

## SYSTEMS and climate

**53. Which of the following is an example of an ecosystem?**

- ☐ a. A city
- ☐ b. A forest
- ☐ c. An aquarium
- ☐ d. a and b only
- ☐ e. a, b and c

Estimated percentage of students who will answer correctly:

**54. Choose the choice that you think is the INCORRECT answer SELECTED MOST OFTEN by your students:**

**Which of the following is an example of an ecosystem?**

- ☐ a. A city
- ☐ b. A forest
- ☐ c. An aquarium
- ☐ d. a and b only
- ☐ e. a, b and c

**55. A piece of rock contains some carbon atoms. Which of the following would a scientist agree might have contained these exact same carbon atoms 100 million years ago?**

- ☐ a. A dinosaur.
- ☐ b. Carbon dioxide gas in the air.
- ☐ c. A tree.
- ☐ d. Any of the above is possible.
- ☐ e. None of the above; the carbon atoms can only have been part of the rock.

Estimated percentage of students who will answer correctly:

## Climate to Curriculum Teacher Pre-Survey

**56. Choose the choice that you think is the INCORRECT answer SELECTED MOST OFTEN by your students:**

**A piece of rock contains some carbon atoms. Which of the following would a scientist agree might have contained these exact same carbon atoms 100 million years ago?**

- ☐ a. A dinosaur.
- ☐ b. Carbon dioxide gas in the air.
- ☐ c. A tree.
- ☐ d. Any of the above is possible.
- ☐ e. None of the above; the carbon atoms can only have been part of the rock.

**57. Which of the following is NOT a part of the water cycle?**

- ☐ a. Snow falling from clouds.
- ☐ b. Water evaporating from the ocean.
- ☐ c. Water absorbed by plants.
- ☐ d. Water in the ground.
- ☐ e. All of the above are part of the water cycle.

Estimated percentage of students who will answer correctly:

**58. Choose the choice that you think is the INCORRECT answer SELECTED MOST OFTEN by your students:**

**Which of the following is NOT a part of the water cycle?**

- ☐ a. Snow falling from clouds.
- ☐ b. Water evaporating from the ocean.
- ☐ c. Water absorbed by plants.
- ☐ d. Water in the ground.
- ☐ e. All of the above are part of the water cycle.



## Climate to Curriculum Teacher Pre-Survey

### 59. Earth's climate system is affected by changes in:

- ☐ a. Ocean currents.
- ☐ b. Earth's orbit.
- ☐ c. Greenhouse gases in the atmosphere.
- ☐ d. Movement of continental plates.
- ☐ e. All of the above.

Estimated percentage of students who will answer correctly:

### 60. Choose the choice that you think is the INCORRECT answer SELECTED MOST OFTEN by your students:

#### Earth's climate system is affected by changes in:

- ☐ a. Ocean currents.
- ☐ b. Earth's orbit.
- ☐ c. Greenhouse gases in the atmosphere.
- ☐ d. Movement of continental plates.
- ☐ e. All of the above.

### 61. Energy is transferred through which of the following systems:

- ☐ a. The food chain
- ☐ b. Earth's climate system
- ☐ c. Human circulatory system
- ☐ d. Both a and b
- ☐ e. All of the above

Estimated percentage of students who will answer correctly:

## Climate to Curriculum Teacher Pre-Survey

**62. Choose the choice that you think is the INCORRECT answer SELECTED MOST OFTEN by your students:**

**Energy is transferred through which of the following systems:**

- ☐ a. The food chain
- ☐ b. Earth's climate system
- ☐ c. Human circulatory system
- ☐ d. Both a and b
- ☐ e. All of the above

# Climate to Curriculum Teacher Pre-Survey

## MODELS and climate

**63. Which of the following would make a reasonable model for rising air near the Earth's equator?**

- ☐ a. Cold air on top of a mountain
- ☐ b. Smoke from a candle
- ☐ c. A hot air balloon
- ☐ d. Both b and c are reasonable models
- ☐ e. All of the above are reasonable models

Estimated percentage of students who will answer correctly:

**64. Choose the choice that you think is the INCORRECT answer SELECTED MOST OFTEN by your students:**

**Which of the following would make a reasonable model for rising air near the Earth's equator?**

- ☐ a. Cold air on top of a mountain
- ☐ b. Smoke from a candle
- ☐ c. A hot air balloon
- ☐ d. Both b and c are reasonable models
- ☐ e. All of the above are reasonable models

**65. Which of the following is the most similar to mantle convection?**

- ☐ a. Smoke rising above a fire on a calm day.
- ☐ b. Ocean water being stirred up by surface winds.
- ☐ c. Lava collecting into pools at the base of a volcano.
- ☐ d. Mud sinking to the bottom of a lake.
- ☐ e. Sand moving as dunes across the desert.

Estimated percentage of students who will answer correctly:

## Climate to Curriculum Teacher Pre-Survey

**66. Choose the choice that you think is the INCORRECT answer SELECTED MOST OFTEN by your students:**

**Which of the following is the most similar to mantle convection?**

- ☐ a. Smoke rising above a fire on a calm day.
- ☐ b. Ocean water being stirred up by surface winds.
- ☐ c. Lava collecting into pools at the base of a volcano.
- ☐ d. Mud sinking to the bottom of a lake.
- ☐ e. Sand moving as dunes across the desert.

**67. Have you ever used or played with an interactive computer model before? (Choose any that apply).**

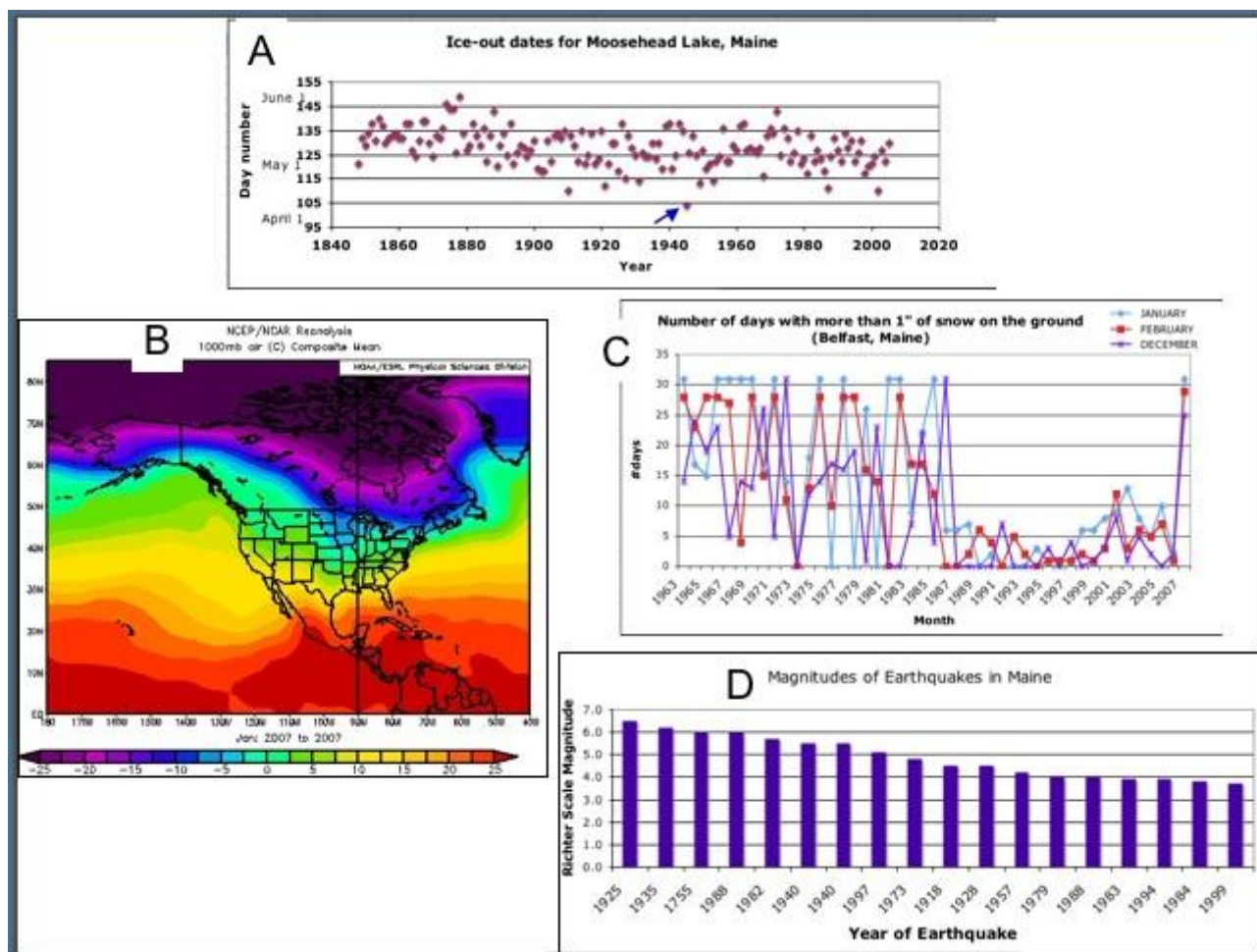
- ☐ a. NetLogo or StarLogo models on the MLTI laptops
- ☐ b. A climate or weather model of any kind
- ☐ c. Modeling software such as STELLA
- ☐ d. Architectural or other design/modeling software
- ☐ e. Any other interactive computer model

Other (please explain)

	5
	6

# Climate to Curriculum Teacher Pre-Survey

## CONSTANCY & CHANGE and climate



68. Which of the graphs above shows a time-series (ie. shows change over time)?

- ☐ a. A
- ☐ b. B
- ☐ c. C
- ☐ d. D
- ☐ e. only 2 of the graphs
- ☐ f. only 3 of the graphs

Estimated percentage of students who will answer correctly:

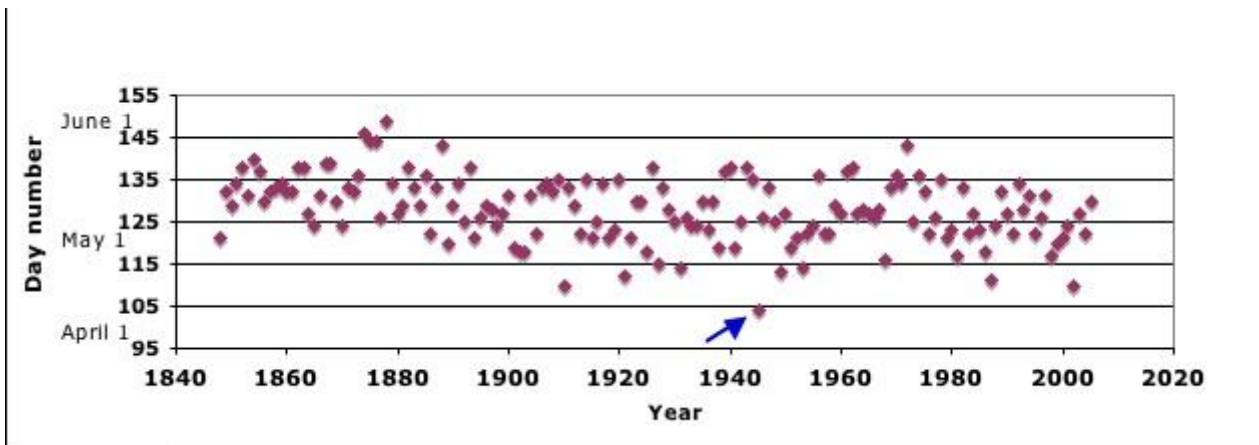
## Climate to Curriculum Teacher Pre-Survey

69. Choose the choice that you think is the **INCORRECT** answer **SELECTED MOST OFTEN** by your students:

Which of the graphs above shows a time-series (ie. shows change over time)?

- ☐ a. A
- ☐ b. B
- ☐ c. C
- ☐ d. D
- ☐ e. only 2 of the graphs
- ☐ f. only 3 of the graphs

**Ice-out dates for Moosehead Lake, Maine**



70. This graph shows which day of the year the ice melted off of Moosehead Lake for each year since around 1850. Which of the following claims is best supported the graph?

- ☐ a. There has been no apparent change in the timing of ice-out at Moosehead Lake since 1850.
- ☐ b. Ice out appears to be earlier now than in 1850, but it hasn't changed much since around 1920.
- ☐ c. Any change in the timing of ice-out can't be determined because the points are too scattered.
- ☐ d. The coldest year for Moosehead was in the 1940s (blue arrow).
- ☐ e. The graph does not support any of the claims above.

Estimated percentage of students who will answer correctly:

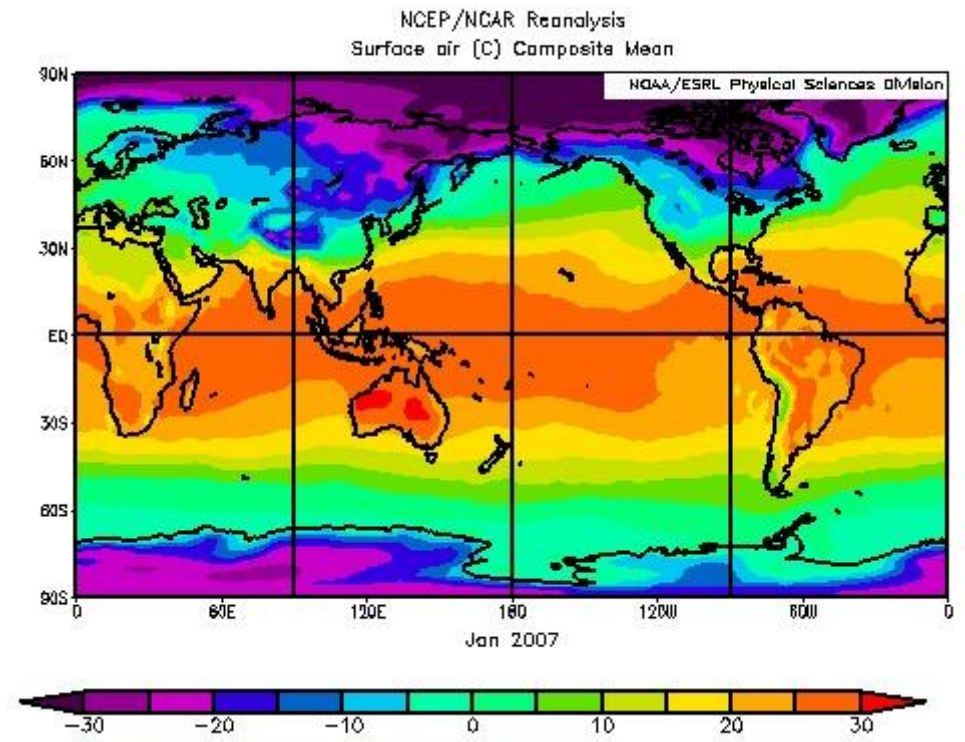
## Climate to Curriculum Teacher Pre-Survey

71. Choose the choice that you think is the **INCORRECT** answer **SELECTED MOST OFTEN** by your students:

This graph shows which day of the year the ice melted off of Moosehead Lake for each year since around 1850. Which of the following claims is best supported the graph?

- ☐ a. There has been no apparent change in the timing of ice-out at Moosehead Lake since 1850.
- ☐ b. Ice out appears to be earlier now than in 1850, but it hasn't changed much since around 1920.
- ☐ c. Any change in the timing of ice-out can't be determined because the points are too scattered.
- ☐ d. The coldest year for Moosehead was in the 1940s (blue arrow).
- ☐ e. The graph does not support any of the claims above.

**Average monthly temperature (degrees Celsius), January, 2007**



## Climate to Curriculum Teacher Pre-Survey

### 72. This figure shows:

- ☐ a. How the temperature changed over time during the month of January 2007
- ☐ b. The highest temperature recorded on Earth in January 2007
- ☐ c. How the average temperature varied at different locations on Earth in January in 2007
- ☐ d. Where temperature and precipitation were greatest in January 2007
- ☐ e. How temperature changed around the Earth throughout 2007

Estimated percentage of students who will answer correctly:

### 73. Choose the choice that you think is the **INCORRECT** answer **SELECTED MOST OFTEN** by your students:

#### This figure shows:

- ☐ a. How the temperature changed over time during the month of January 2007
- ☐ b. The highest temperature recorded on Earth in January 2007
- ☐ c. How the average temperature varied at different locations on Earth in January in 2007
- ☐ d. Where temperature and precipitation were greatest in January 2007
- ☐ e. How temperature changed around the Earth throughout 2007



# Climate to Curriculum Teacher Pre-Survey

## You're finished!

Thank you!

Acknowledgements:

Many of the questions on this survey were developed by the MOSART (Misconceptions-Oriented Standards-based Assessment Resources for Teachers) Team led by Dr. Phil Sadler, Harvard-Smithsonian Center for Astrophysics. See [http://www.cfa.harvard.edu/smgphp/mosart/about\\_mosart.html](http://www.cfa.harvard.edu/smgphp/mosart/about_mosart.html) for more information.